



### 1) Degree Centrality Analysis

Generally, if an actor has direct association with many other actors, then the actor is in central position<sup>[3]</sup>. Under guidance of this kind of thinking, the calculation of one point's degree centrality can use the number of points which have a direct relationship with the point. In other words, degree centrality of a point is the comprehensive of out degree and in degree.

### B. Centrality Analysis

Figure 2 lists out degree, in degree, relative out degree and relative in degree of 42 political blogs selected. As you can see, the highest degree centrality in 42 political blogs is point H, followed by L, Y, AI, B, AU, K, J, AX, A, G, E, AE, C, AV, AQ, AD, P, AA, R, F, AM, N, W, AB, S, V, I, AS, AH, AJ, U, D, AR, AP, M, Z, AF, AK, AL, AC, X from high to low respectively. The highest degree centrality reaches twenty-one degree. A's out and in degree are average, respectively reaches 11 and 10. This shows the blogroll number that Number H blog (blog name is: LiangJiangJuShi) issued and accepted is share and share alike. Number H is very active. It received concern from others and also concerned others comparatively. Moving to the second place, we find point L reaches sixteen degree. Its out and in degree are very uneven, the out is only 1 while the in is 15. This shows that Number L blog (blog name is SongChengCe) pay little attention on other bloggers compared with the attention others pay on him. Point Y, AI, B, AU and K rank in the third place, the four points have lower out degree and higher in degree according to the arrangement order. Among them, the out degree of Y and AI is 13, and the in degree is 0. This shows that no one pays attention on them, but they still pay much attention on others.

### 1) Betweenness Centrality Analysis

If an actor is in the shortcut between many other actors, this actor is in an important position<sup>[3]</sup>. According to this kind of thinking, betweenness centrality can be used to measure the resources control degree of the actor.

Figure 3 represents betweenness centrality and relative betweenness centrality of the 42 points. According to the figure, it is easy to find an order of the 42 political blogs' betweenness centrality from high to low respectively, it is: H, AU, B, E, G, K, AX, L, P, AA, J, AB, AD, AM, C, AE, AV, AQ, A, R, V, W, AS, I, AH, M, S, Y, AF, Z, AC, AJ, AK, AL, D, AP, F, AR, U, N, AI, X. The highest betweenness centrality belongs to point H, which explains that Numbers H blog (blog name is: LiangJiangJuShi) is in the important connection position in the network, and masters relatively more knowledge and resources than the other bloggers, plays a promoting and coordinating role in the interaction between others.

### 2) Closeness Centrality

It is known to us that if one actor is less dependent on others in contacting process, he/she has higher centrality<sup>[3]</sup>. According to closeness centrality thought (namely a point is much closer with other points, its communication with the outside world is more independent), closeness centrality index can depict the center index.

		OutDegree	InDegree	NrnOutDeg	NrnInDeg
2	Y	13.000	0.000	31.707	0.000
1	AI	13.000	0.000	31.707	0.000
8	H	11.000	10.000	26.829	24.390
2	B	9.000	4.000	21.951	9.756
2	AX	8.000	3.000	19.512	7.317
0	AU	7.000	6.000	17.073	14.634
0	J	7.000	5.000	17.073	12.195
1	A	5.000	5.000	12.195	12.195
7	G	5.000	4.000	12.195	9.756
7	AQ	5.000	1.000	12.195	2.439
1	K	5.000	8.000	12.195	19.512
5	E	4.000	3.000	9.756	7.317
5	AH	4.000	1.000	9.756	2.439
7	AD	4.000	2.000	9.756	4.878
5	P	4.000	2.000	9.756	4.878
4	AA	3.000	3.000	7.317	7.317
8	AE	2.000	5.000	4.878	12.195
3	C	2.000	5.000	4.878	12.195
6	R	2.000	4.000	4.878	9.756
0	W	2.000	2.000	4.878	4.878
9	U	2.000	1.000	4.878	2.439
1	AU	2.000	5.000	4.878	12.195
9	AS	1.000	1.000	2.439	2.439
2	L	1.000	15.000	2.439	36.585
9	I	1.000	2.000	2.439	2.439
4	D	1.000	0.000	2.439	0.000
8	AR	1.000	0.000	2.439	0.000
5	AB	1.000	3.000	2.439	7.317
0	AH	1.000	1.000	2.439	2.439
6	AP	1.000	0.000	2.439	2.439
3	M	0.000	1.000	0.000	2.439
3	Z	0.000	1.000	0.000	2.439
9	F	0.000	1.000	0.000	2.439
2	AJ	0.000	2.000	0.000	4.878
3	AK	0.000	1.000	0.000	2.439
4	AL	0.000	1.000	0.000	2.439
6	F	0.000	6.000	0.000	14.634
7	S	0.000	0.000	0.000	9.756
8	U	0.000	2.000	0.000	4.878
4	N	0.000	5.000	0.000	12.195
6	AC	0.000	1.000	0.000	2.439
1	X	0.000	1.000	0.000	2.439

Fig. 2. Degree Centrality

		Betweenness	nBetweenness
8	H	230.000	14.024
40	AU	176.183	10.743
2	B	122.033	7.441
5	E	113.533	6.923
7	G	105.700	6.445
11	K	97.817	5.964
42	AX	86.067	5.248
12	L	73.333	4.472
15	P	52.667	3.211
4	D	47.200	2.878
10	J	45.450	2.771
25	AB	41.333	2.520
27	AD	30.667	1.870
35	AH	30.000	1.829
6	AP	29.250	1.756
28	AE	12.900	0.787
41	AU	9.667	0.589
37	AQ	7.667	0.480
1	A	7.583	0.462
16	R	6.833	0.417
19	U	2.667	0.163
20	W	1.500	0.091
39	AS	1.000	0.061
9	I	0.500	0.030
30	AH	0.250	0.015
13	M	0.000	0.000
17	S	0.000	0.000
22	Y	0.000	0.000
29	AF	0.000	0.000
23	Z	0.000	0.000
26	AC	0.000	0.000
32	AJ	0.000	0.000
33	AK	0.000	0.000
34	AL	0.000	0.000
4	D	0.000	0.000
36	AP	0.000	0.000
6	F	0.000	0.000
38	AR	0.000	0.000
18	U	0.000	0.000
14	N	0.000	0.000
31	AI	0.000	0.000
21	X	0.000	0.000

Fig. 3 Betweenness Centrality

Figure 4 provides closeness centrality of the 42 points. It is easy to figure out the closeness centrality rank from high to low respectively. That is H, K, AU, E, J, AX, L, G, A, C, AE, AB, I, AV, R, B, AA, AQ, V, AD, Y, AI, P, AM, AS, F, AJ, S, AC, AL, U, D, AF, Z, W, AR, AP, N, AH, AK, X, M. Point H (blog name is: LiangJiangJuShi) has the highest closeness centrality. It is in the important bridging position in the network, and plays an important role in network transmission. The interactions of many other actors often depend on it, point of performance H.

### 3) Comprehensive Analysis

There is a table provides the degree centrality, betweenness centrality and closeness centrality ranking results from high to low in a form of merger, as it is showed in table 1.

Make comparison and analysis on data in table 1, we can get some conclusions:

		inFarness	outFarness	inCloseness	outCloseness
6	F	530.000	1722.000	7.736	2.381
12	L	590.000	885.000	6.949	4.633
32	AJ	590.000	1722.000	6.949	2.381
17	S	592.000	1722.000	6.926	2.381
26	AC	598.000	1722.000	6.856	2.381
40	AU	604.000	864.000	6.788	4.745
8	H	611.000	834.000	6.710	4.916
41	AV	612.000	903.000	6.699	4.540
5	E	615.000	853.000	6.667	4.807
34	AL	616.000	1722.000	6.656	2.381
18	U	616.000	1722.000	6.656	2.381
11	K	617.000	846.000	6.645	4.846
28	AE	617.000	878.000	6.645	4.670
16	R	617.000	903.000	6.645	4.540
29	AF	618.000	1722.000	6.634	2.381
23	Z	618.000	1722.000	6.634	2.381
25	AB	619.000	885.000	6.624	4.633
3	C	628.000	861.000	6.529	4.762
10	J	629.000	839.000	6.518	4.887
42	AX	631.000	840.000	6.498	4.881
7	G	633.000	842.000	6.477	4.869
1	A	634.000	843.000	6.467	4.864
9	I	641.000	867.000	6.396	4.729
14	N	1278.000	1722.000	3.208	2.381
2	B	1320.000	594.000	3.106	6.902
24	AA	1323.000	616.000	3.099	6.656
37	AQ	1329.000	610.000	3.085	6.721
19	U	1329.000	615.000	3.085	6.667
27	AD	1330.000	630.000	3.083	6.508
15	P	1600.000	569.000	2.563	7.206
20	W	1640.000	813.000	2.500	5.043
35	AM	1641.000	547.000	2.498	7.495
33	AK	1681.000	1722.000	2.439	2.381
13	M	1681.000	1722.000	2.439	2.381
30	AH	1681.000	1681.000	2.439	2.439
21	X	1681.000	1722.000	2.439	2.381
39	AS	1681.000	536.000	2.439	7.649
36	AP	1722.000	866.000	2.381	4.734
38	AR	1722.000	827.000	2.381	4.958
4	D	1722.000	617.000	2.381	6.645
31	AI	1722.000	435.000	2.381	9.425
22	Y	1722.000	318.000	2.381	12.893

Fig. 4. Closeness Centrality

a) Point H always has the highest value whether in degree centrality, betweenness centrality or closeness centrality, which shows that Number H blog (blog users name is: LiangJiangJuShi) has a strong communication ability with other blogs, and has a good control in other bloggers' opinion exchanging. It is core blog and opinion leader in network with out doubt.

b) Each centrality index of point L, AU, K, E, G, J and AX are relatively on the high side. They belong to the relatively core actors in this network. Namely Number L, AU, K, E, G, J and AX blogs (blog users name are respectively: SongChengCe, LiOu, BiHanFeng, WenHai, LinWei, FaXiaYe and ZhaoLianJun) have comparatively strong interacting ability and resource control ability.

c) Under normal circumstances, degree centrality, betweenness centrality and closeness centrality are related by each other. There appeared abnormal individual points during the analysis of political blogs in the BBS groups of people. Their degree centrality, betweenness centrality and closeness centrality are not related, the values appear huge disparity. These exceptional point are B, Y, A, P, AB, I, AM, F, AM, W, AI, N, AH, M, AC and AL. They both have very interesting structures in the network. Points with low degree centrality and high betweenness centrality are: P, AB, AM, M and AC; Points with high degree centrality and low betweenness centrality are: Y, A, F, AI and N; Points with low degree centrality and high closeness centrality are: AB, I, AC and AL; Points with high degree centrality and low closeness centrality are: B, Y, W, AI, N and AH; Points with low betweenness centrality and high closeness centrality are: A, I, F

and AI; Points with high betweenness centrality and low closeness centrality are: B, P, AM, W, AH and M.

TABLE I. THE DEGREE CENTRALITY, BETWEENNESS CENTRALITY AND CLOSNESS CENTRALITY RANKING

From High To Low	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Degree Centrality	H	L	Y	A	B	A	K	J	A	A	G	E	A	C
Betweenness Centrality	H	A	B	E	G	K	A	L	P	A	J	A	A	A
Closeness Centrality	H	K	A	E	J	A	L	G	A	C	A	A	I	A

  

From High To Low	1	1	1	1	1	2	2	2	2	2	2	2	2	2
Degree Centrality	V	Q	D	P	A	R	F	A	M	N	W	A	S	V
Betweenness Centrality	C	A	A	A	A	R	V	W	A	I	A	M	S	Y
Closeness Centrality	R	B	A	A	V	A	Y	A	P	A	A	F	A	S

  

From High To Low	2	3	3	3	3	3	3	3	3	3	4	4	4	4
Degree Centrality	S	H	J	U	D	A	A	M	Z	A	A	A	A	X
Betweenness Centrality	A	Z	A	A	A	A	D	A	F	A	U	N	A	X
Closeness Centrality	A	A	U	D	A	Z	W	A	A	N	A	A	X	M

If degree centrality, betweenness centrality and closeness centrality are not related positively, there will be an interesting structure among the network. The relations that they may have are as table 2 shows.

According to the table above abnormal points, such as B, Y, A, P, AB, I, AM, F, W, AI, N, AH, M, AC and AL, can be classified into several groups.

d) Points with low degree centrality and high betweenness centrality: P, AB, AM, M, AC (their blog's name are: XianSanYiShi, SongBaoShi, XiuFei, TaiYangZaiYuWei and ZhangRui). These blog have a little direct relationship, but among these relationship there is a few that is crucial for the whole link flow in the network. That is to say, although they may not figure in the community living center, but get a major impact on the exchange of information across the network.

e) Points with high degree centrality and high betweenness centrality: Y, A, F, AI, N (their blog's name are: DongFangADe, YunZhongYue, QinHanXiongFeng, GengNiuCunCao and JinShiYi). The blog's relations are quite a lot, but many are redundant for the entire network. They have little effect on the exchange of information for the network.

f) Points with low degree centrality and high closeness centrality: AB, I, AC, AL (their blog's name are: SongBaoShi, QingdaoXiaoHeiZi, ZhangRui and LiaoXinBo). The blogs' friendship relation link is not much, but very pure. Among them there are key figures of the network.

TABLE II. THE SPECIAL RELATIONS

	Low Degree Centrality	Low Closeness Centrality	Low Betweenness Centrality
High Degree Centrality		The cluster it embedded points away from the rest of the network.	Its contacting points around it have redundant relationships between each other.
High Closeness Centrality	The point is associated with important key figures		A number of multiple ways may exist in the network; "self" is close with many points, while others may also get closed with each other.
High Betweenness Centrality	Part of the point's relationship is critical for network 's flow.	Such points are really rare, such points monopolized most relationships of a few people point to others in the network.	

g) Points with high degree centrality and low closeness centrality: B,Y,W,Al,N,AH (their blog's name are: Zhou PengAn, Dong FangADe, Tai Shan DaoRen, GengNiu CunCao, JinShiYi and I love you dear China). They have lots of relationship, but rarely have had any contact with important. They are embedded in clusterings away from the other network.

h) Points with low betweenness centrality and high closeness centrality: A,I,F,Al (their blog's name are: YunZhongYue, QingdaoXiaoHeiZi, QinHanXiongFeng, GengNiuCunCao).A number of ways may exist in the network around them, they can get access to many blogs, other blogs can also easily get closed to others.They have little effect on the exchange of information for the network.

i) Points with high betweenness centrality and low closeness centrality:B,P,AM,W,AH,M (their blog's name are: ZhouPengAn, XianSanYiShi, XiuFei, TaiShanDaoRen, I love you dear China and TaiYangZaiYuWei.).Tthis type is rare. The blog form the monopoly of a few blogs from others, they

are just like the "Yangtze River Bridge" of the network. This type of blog can completely determin the information exchange between a small number of blogs and other blogs in the networks.

#### IV. CONCLUSION

Through the social network centrality analysis of top50 political blogs in people BBS, it is easy to find the core member in the network (Number H LiangJiangJuShi) and relatively important members (Number L, AU, K, E, G, J and AX respectively named SongChengCe, LiOu, BiHanFeng, WenHai, LinWei, FaXiaYe and ZhaoLianJun). Meanwhile the four groups of abnormal centrality indexes have also been found.

The finding of these important members can help to guide the primary standpoints of political blogs pertinently and also provides the possibility to predict the growing trend of political groups' opinions on public affairs.

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